SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Draft Staff Report for Proposed Amended Rule 1171 - Solvent Cleaning Operations

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EXECUTIVE SUMMARY

Rule 1171 requires that a technology assessment be completed for specific cleaning applications with low-VOC content targets for 2005 in order to evaluate the progress in technology development, and determine whether such VOC limits (Tier II) established during the 1999 rule amendment are achievable. Technology assessments have been completed for most of the cleaning categories identified in the rule including the cleaning of electrical apparatus/electronic components, coating/adhesive application equipment, and specialty flexographic printing ink application equipment.

Proposed Amended Rule (PAR) 1171 – Solvent Cleaning Operations will implement the recommendations in the technology assessments for those cleaning applications where studies have been completed. In addition, PAR 1171 will delay by one-year the implementation of low-VOC limits originally scheduled for July 1, 2005 for the cleaning of screen printing, lithographic/letterpress printing, and ultraviolet or electron beam (UV/EB) ink application equipment. The technology assessment for these cleaning applications is still on-going, but is expected to be completed by the end of November 2005. An interim VOC limit is being proposed for these cleaning applications to take advantage of existing products in the market with lower VOC content than the current rule limit.

PAR 1171 is expected to achieve VOC emission reductions of 5.27 tons per day in 2005 even with the delay in the implementation of certain VOC limits. Additional emission reductions of 2.52 tons per day are anticipated in 2006. These emission reductions are part of the Tier II reductions of 9 tons per day in 2005, originally projected during the 1999 rule amendment, that are subject to technology assessments. The August 2002 rule amendment already accelerated 1.94 tons per day of the Tier II emission reductions because of the availability at that time of compliant products for certain cleaning applications.

Other amendments include adding clarifying language to enhance rule effectiveness. The proposed amendments to Rule 1171 are as follows:

- delay by one year the compliance date for the use of low-VOC solvents for cleaning screen printing, lithographic/letterpress, and ultraviolet/electron beam ink application equipment; and establish an interim VOC limit of 500 grams per liter of material for such cleaning applications;
- establish a limited exemption from the rule VOC limit for the cleaning of adhesive application equipment used in thin metal laminating operations; the cleaning of electronic/electrical cables; touch-up cleaning of certain printed circuit boards; cleaning of metering rollers, dampening rollers and printing plates; and clean-up of application equipment used for applying solvent-borne fluoropolymer coatings;
- modify rule applicability to include toxic air contaminants;
- extend the exemption for the cleaning of stereolithography equipment and models, and UV/EB lamps used for curing UV/EB inks or coatings;
- modify rule language to include the most current test methods for determining the efficiency of an emission control system;

- eliminate the general prohibition exemption for methylene chloride and perchloroethylene;
- remove obsolete rule provisions; and
- add clarifying language to the rule.

BACKGROUND

Rule 1171 – Solvent Cleaning Operations, a key component of South Coast Air Quality Management District's (AQMD) ozone reduction strategy, was adopted on August 2, 1991 to reduce VOC emissions from the use of solvents and solvent wastes generated during the production, repair, maintenance, or servicing of products, tools, machinery, and general work areas. Subsequent rule amendments expanded the scope of the rule to cover all solvent cleaning activities at all facilities.

The October 1999 amendment established a two-tiered approach in lowering the VOC content limits for all solvent cleaning activities. Tier I was implemented on December 1, 2001, and had an equivalent VOC emission reduction of 6 tons per day from solvent cleaning activities. The second tier has a compliance date of July 1, 2005, with an estimated emission reduction of 9 tons per day. These emission reductions were expected to be achieved through greater use of aqueous cleaning technologies and VOC-exempt solvents, or through the development of new low-VOC cleaning materials. In addition, the 1999 amendment required that a technology assessment be conducted for specific cleaning categories in order to determine the feasibility of the Tier II VOC limits for these categories. The rule also required a study of the effect of vapor pressure on the total mass emissions of VOCs from the use of cleaning solvents.

In August 2002, Rule 1171 was further amended to accelerate the reduction of 1.94 tons per day of the VOC emissions from general solvent cleaning activities by two and one-half years starting in 2003. During that time, many available low-VOC cleaning materials were already meeting the Tier II VOC limit of 25 grams per liter for general cleaning applications. As a result, the compliance date for the 25 grams per liter VOC limit for general cleaning applications was advanced to January 1, 2003.

The last amendment to Rule 1171 (November 2003) achieved an expected VOC emission reduction of seven and one-half tons per day by eliminating the exemption for the cleaning of architectural coating application equipment starting July 1, 2005. This amendment implemented the clean-up solvent portion of two control measures (CM#2003CTS-07 and CTS-10 (P1)) in the 2003 Air Quality Management Plan (AQMP).

As mentioned earlier, the 1999 rule amendment called for the completion of technology assessments for several cleaning categories in order to determine the progress in technology development, relative to the 2005 VOC limits, and assess whether future amendments are necessary. The technology assessments for most of the cleaning applications have now been completed. These cleaning applications include the cleaning of electrical apparatus/electronic components, coating/adhesive application equipment and the cleaning of certain ink application equipment. The technology assessment for ink application equipment used for lithography/letterpress and screen printing is still on-going. Preliminary results are promising and indicate that the 2005 limits are achievable, but extended field testing is needed to

determine if there are compatibility problems associated with the use of alternative cleaners over time. Staff expects the study to be completed in November 2005.

Proposed Amended Rule (PAR) 1171 reflects the findings and recommendations presented in the technology assessment for certain cleaning applications.

TECHNOLOGY REVIEW

In order to support the 2005 VOC limits and emission reduction goals in Rule 1171, the AQMD funded several research projects aimed at identifying low-VOC cleaning technologies that could be used as alternative to high-VOC solvent cleaners used on specific cleaning activities. The AQMD contracted with the Institute for Research and Technical Assistance (IRTA) to assess the existing technology and develop and test low or non-VOC cleaning technologies that comply with the future VOC limits for specific cleaning activities in Rule 1171. The focus of the study was to evaluate the technical feasibility and cost of the low-VOC alternatives. IRTA's two-year research project focused on the following cleaning application areas:

- cleaning of electrical apparatus components and electronic components;
- coating and adhesive application equipment cleaning; and
- cleaning of ink application equipment (except lithographic/letterpress printing)

The project has been completed and a final report dated August 2003, and titled "Assessment, Development and Demonstration of Low-VOC Cleaning Systems for South Coast Air Quality Management District Rule 1171" has been prepared. The results of the study indicate that new and existing low-VOC cleaning technologies meeting the 2005 VOC limits in Rule 1171 can be used for most of the cleaning applications identified in the study. These low-VOC cleaning materials include water-based cleaners, VOC-exempt compounds such as acetone and volatile methyl siloxane (VMS), blends of VOC-exempt compounds, and soy cleaners. The effectiveness of the alternative cleaners varies according to the type of cleaning application. Details of case studies involving the use of alternative cleaning technologies are included in the final report for the technology assessment. The results of the study are summarized below.

In the area of electrical apparatus/electronic components cleaning, IRTA worked with a number of companies with operations that involve flux removal. Such operations include printed circuit board rework, hybrid circuit and transformer manufacturing. Testing of alternative low-VOC cleaners at several companies participating in the study indicated that plain de-ionized (DI) water, water-based saponifiers, acetone, blends of acetone and isopropyl alcohol (IPA) and DI water/acetone/IPA blends are good solvent substitute cleaners for flux removal, depending on the characteristics of the operation. Specifically, DI water was effective in removing water-soluble flux while a blend of acetone and IPA successfully cleaned rosin-based flux.

Companies involved in the manufacture/rebuilding of electric motors and repair and maintenance of field electrical equipment were also included in the study. Water-based cleaners and soy/water blends have been found to be effective alternatives for non-energized equipment. One of the companies involved in the study has been using water-based cleaners for cleaning non-energized equipment for many years. An aerosol formulation containing HCFC-141b, a VOC-exempt compound, is currently being used for cleaning energized electrical equipment. Production of this chemical has been banned since 2003 and availability

of this product may become scarce in the near future. Facilities may use up to 160 fluid ounces per day of non-compliant aerosol cleaners to serve this purpose. In addition, newer exempt compounds may be de-listed by EPA and AQMD and would be available for use as cleaning solvents.

For the cleaning of solar cells, laser hardware, scientific instruments and high-precision optics, the results of the study indicated that acetone and acetone/IPA blends are effective alternative cleaners for these applications. Furthermore, additional data available to staff indicate that acetone is currently being used by several optics manufacturers for wipe-cleaning of high-precision optics.

While the technology assessment for cleaning of electrical/electronics apparatus components has been successful in finding alternatives for most of the applications tested, the study also found that solvent formulations with 100 grams per liter of VOC or less (2005 VOC target) were not effective in removing flux and silicone grease from electrical cables. Water-based cleaners could not be used on the cables because of wicking effect which may cause failure. Instead, a blend of 50 percent IPA/50 percent acetone (395 g/l VOC) was successfully tested as an alternative cleaner.

For cleaning coating and adhesive application equipment, the study focused on finding alternative cleaners for removing contaminants such as epoxy primers, polyurethane topcoats and solvent-borne coatings for aerospace, metal, wood and auto body coating applications. Testing was also conducted for removing adhesives. The results of the study indicate that alternative cleaners meeting the 2005 VOC limits for these applications were identified and successfully tested for these cleaning applications. For the most part, acetone-based cleaners were effective in cleaning coating and adhesives application equipment. In certain instances, a blend of acetone and methyl acetate (VOC-exempt) was used for removing high-solids coatings.

However, the study also indicated that none of the alternatives tested by IRTA was able to remove the tetrahydrofuran (THF)-based solvent-borne adhesive residue from the application equipment. This type of adhesive is used in thin metal laminating operation. THF-based solvent is currently used to clean the adhesive application equipment. The VOC content of the THF solvent is about 900 grams per liter.

For the cleaning of ink application equipment used in specialty flexographic printing, water-based cleaners meeting the target VOC limit have been successfully tested as alternatives to high-VOC cleaning solvents. One company identified in the study has been using water-based cleaners for several years.

In regard to the cleaning of ink application equipment for screen printing, alternative solvents such as acetone, blends of acetone and glycol ether, soy and water-based cleaners have been identified and successfully tested for removing various types of inks on different substrates. However, further testing is needed to validate the results specifically for textile screen printing. Additional testing on screen printing applications is on-going.

For other cleaning applications involving lithographic/letterpress printing and UV/EB ink application equipment, the AQMD has an existing contract with 3 contractors to develop and test alternative low-VOC clean-up materials. Initial results of the testing indicate that low-VOC cleaning technologies can be used to substitute for high-VOC cleaning solvents in wipe

cleaning applications. However, long-range testing of the potential alternative cleaners in different cleaning operations, including automatic blanket wash systems, is needed in order to determine if any equipment compatibility problems exist with the use of the proposed alternatives over an extended period of time. This study is expected to be completed by the end of November 2005. The clean-up of screen printing ink application equipment is also included in the long-term study.

Rule 1171 requires the completion of another technology assessment to study the effect of vapor pressure on the total mass emission of VOCs from the use of cleaning solvents. An in-house study has been completed to evaluate this relationship. The study concluded that vapor pressure has no effect on VOC mass emissions, and that lower vapor pressure limits will not result in further reduction of VOC emissions. A report on the vapor pressure study, titled "Technology Assessment to Determine the Relationship of Solvent Vapor Pressure and VOC Mass Emissions," dated April 10, 2002, has been completed and is available upon request.

Based on the findings in the technology assessment completed for various applications, staff is confident that the 2005 limits for most of the cleaning applications can be implemented as scheduled. These applications include the cleaning of electrical apparatus/electronic components, coatings/adhesives application equipment, and ink application equipment for specialty flexographic printing. For the remaining lithographic printing applications, representatives of the printing industry indicate that cleaning materials with VOC contents lower than the present limits allowed in Rule 1171 are currently available and can be used in the interim until the technology assessment for ink application equipment is completed.

LEGISLATIVE AUTHORITY

The California Legislature created the South Coast Air Quality Management District (AQMD) in 1977 (The Lewis-Presley Air Quality Management Act, Health and Safety Code Section 40400 et seq.) as the agency responsible for developing and enforcing air pollution control rules and regulations in the South Coast Air Basin (Basin). By statute, the AQMD is required to adopt an Air Quality Management Plan (AQMP) demonstrating compliance with all state and federal ambient air quality standards for the Basin [California Health and Safety Code Section 40460(a)]. Furthermore, the AQMD must adopt rules and regulations that carry out the AQMP [California Health and Safety Code Section 40440(a)].

RULE PROPOSAL

The following summarizes the proposed amendments to Rule 1171.

1. Modify the rule applicability section to include toxic air contaminants

Staff is proposing to amend the purpose and applicability section in subdivision (a) to include the control of toxic air contaminants.

2. Amend the definition language for removable press components

Language is being added to clarify that dampening rollers and printing plates are not considered as removable press components, paragraph (b)(42).

3. **Implement the 2005 VOC limits for the following cleaning categories based on the findings in the technology assessment:**

    a) Product Cleaning/Surface Preparation During Manufacturing of Electronics/Electrical Components, clause (c)(1)(A)(ii)

    b) Repair and Maintenance Cleaning of Electronics/Electrical Components, clause (c)(1)(B)(ii)

    c) Cleaning of Coatings and Adhesives Application Equipment, subparagraph (c)(1)(C)

    d) Cleaning of Ink Application Equipment for Specialty Flexographic Printing, clause (c)(1)(D)(vii)

4. **Delay the VOC compliance date and establish an interim limit for cleaning of certain ink application equipment, paragraph (c)(1)**

    Staff is proposing a one-year delay in the July 2005 implementation date for the use of low-VOC solvents (100 grams per liter or less of VOC) in cleaning lithographic/letterpress, screen printing, and UV/EB ink application equipment. The technology assessment, involving long-range testing of alternative low-VOC cleaners for these cleaning applications, is still on-going but is expected to be completed in November 2005. Staff's proposal sets a new compliance date of July 1, 2006 for the use of low-VOC solvents for cleaning lithographic/letterpress, screen printing, and UV/EB ink application equipment. The target VOC limits of 100 grams per liter remain unchanged.

    In addition to the proposed delay in the VOC compliance date, staff is proposing an interim VOC limit of 500 grams per liter for cleaning lithographic/letterpress, screen printing, and UV/EB ink application equipment. The effective date for the interim limit is July 1, 2005. There are products currently available in the market that meet the proposed interim limit. Furthermore, industry input indicates that existing products can be readily reformulated by solvent suppliers to meet the interim limit of 500 grams per liter. This proposal allows the AQMD to take a portion of the VOC emission reductions originally projected from the cleaning of lithographic/letterpress, screen printing, and UV/EB ink application equipment now rather than at the completion of the technology assessment.

5. **Extend the exemption for stereolithography equipment to December 31, 2008, subparagraph (h)(3)(G)**

    This proposal allows industry additional time for research and testing of alternative solvents for cleaning stereolithography equipment and models. This is also consistent with the compliance date in Rule 1122 for the same cleaning application.

6. **Extend the exemption for the cleaning of UV/EB lamps and reflectors, subparagraph (h)(3)(H)**

    Staff is proposing to extend by one year the exemption for the cleaning of UV/EB lamps and reflectors used for curing UV/EB ink or coatings. Clarifying language has also been added to include the cleaning of reflectors in the exemption. The new sunset date is June 30, 2006, consistent with the proposed compliance date for the use of low-VOC clean-up solvents in UV/EB ink application equipment.

7. Establish a limited exemption for specific cleaning applications

Staff's proposal will establish a limited exemption from the rule VOC requirement for the clean-up of adhesive application equipment used for thin metal laminating operation, subparagraph (h)(3)(I). The VOC content of solvents used for this cleaning application is limited to 950 grams per liter. An exemption is also being proposed for the cleaning of electrical/electronic cables, subparagraph (h)(3)(J), provided the VOC content of the cleaning solvent is no more than 400 grams per liter. Both proposed exemptions are consistent with the findings and recommendations in the technology assessment for such cleaning applications.

In addition, staff is proposing a limited exemption for the following cleaning applications:

a) Touch-up cleaning performed on printed circuit boards where surface mounted devices have already been attached, subparagraph (h)(3)(K). The VOC content of clean-up solvents used for this cleaning application is limited to 800 g/l.

b) Clean-up of metering rollers, dampening rollers and printing plates provided the VOC content of the solvent does not exceed 800 grams per liter, paragraph (h)(8). The proposed exemption has a sunset date of June 30, 2006. The on-going technology assessment for lithographic/letterpress printing includes a study of alternative solvents for these cleaning applications.

c) Until December 31, 2008, the clean-up of application equipment used to apply solvent-borne fluropolymer coatings provided the clean-up solvent used for such cleaning contains no more than 900 grams of VOC per liter.

8. Eliminate the general prohibition exemption for methylene chloride and perchloroethylene, paragraph (e)(3)

Currently, Rule 1171 does not allow the use of materials which contain Group II exempt compounds listed in Rule 102 when performing solvent cleaning activities except methylene chloride and perchloroethylene. Staff's proposal eliminates this exemption and will prohibit the use of methylene chloride and perchloroethylene in solvent cleaning activities.

9. Use the most current test methods for determining efficiency of emission control systems, paragraph (f)(4)

Staff's proposal reflects the most current test methods for determining the efficiency of VOC emission control systems, consistent with those used in other VOC rules.

10. Remove obsolete rule provisions and add clarifying language to the rule

Staff is proposing to remove language in paragraphs (b)(57) and (f)(2) that pertain to VOC composite partial pressure, which is no longer referenced in the rule

Staff's proposal will also eliminate rule provisions concerning technology assessments that have been completed as follows:

a) cleaning of electrical apparatus components and electronic components, paragraph (d)(1);

b) cleaning of coatings and adhesives application equipment, paragraph (d)(2);

c) cleaning of specialty flexographic printing ink application equipment, paragraph (d)(6); and

d) study of the effects of vapor pressure on VOC mass emissions, subdivision (d).

Clarifying language is being added in paragraph (d)(3) to include electron beam ink application equipment in the technology assessment. Additionally, staff is proposing rule language to clarify that the usage limit for the aerosol exemption in paragraph (h)(4) applies to non-compliant aerosol products. Furthermore, a new technology assessment completion date of December 1, 2005 is proposed in subdivision (d) for the cleaning of lithographic/letterpress printing, screen printing, and UV/EB ink application equipment.

EMISSIONS INVENTORY

To assess the emissions impacts of PAR 1171, staff used the emissions data presented in the staff report for the 2002 amendment to Rule 1171. At that time, the 2002 VOC emissions were used as baseline inventory and the 2003 VOC emissions inventory was derived for each cleaning category by applying the emission reductions expected from the January 1, 2003 VOC limits established during the amendment.

In establishing the 2004 baseline VOC emissions inventory for this rule amendment, staff adjusted for growth (2002-2003) the 2003 VOC emissions using the assumed AQMP average annual growth rate of 1.1% for solvent cleaning activity. The same growth rate was applied in determining the 2004 baseline inventories for all cleaning categories. A sample calculation is shown below for Coating and Adhesive Application Equipment category (excluding architectural coating application equipment):

2002 VOC Emissions = 3.03 tons/day

Average Annual Growth Rate = 1.1%

Adjusted 2003 VOC Emissions = (3.03 tons/day) x (1.011) = 3.06 tons/day

2004 VOC Baseline Emissions = (3.06 tons/day) x (1.011) = 3.10 tons/day

In regard to the clean-up of architectural coating application equipment, this cleaning activity was exempt from Rule 1171 prior to the rule amendment in November 2003. The VOC emissions associated with this cleaning activity were accounted for under the source category "Architectural Coatings, Thinning and Clean-up Solvents". However, the 2003 Rule 1171 amendment eliminated the exemption for architectural coating application equipment, and the associated VOC emissions from clean-up solvents are now included as part of the VOC emissions inventory for Rule 1171.

A summary of the VOC emissions for each cleaning category is shown in Table 1. The 2002 and 2003 VOC emissions for clean-up solvents used for architectural coating application were taken from the staff report for the November 2003 Rule 1171 amendment while the 2004 VOC emissions were projected using the assumed AQMP growth rate of 1.1%.

Table 1 – Rule 1171 VOC Emissions Inventory (tons/day)

Cleaning Activity	2002 Emissions Inventory (tons/day)	2003 Emissions Inventory (tons/day)	2004 Emissions Inventory (tons/day)
(A) Product Cleaning & Surface Preparation			
(i) General	2.69	1.36	1.37
(ii) Electrical/Electronic Apparatus & Components	0.50	0.51	0.51
(iii) Medical Devices &Pharmaceuticals	0.72	0.73	0.74
(B) Repair & Maintenance			
(i) General	0.42	0.21	0.21
(ii) Electrical/Electronic Apparatus & Components	0.10	0.10	0.10
(iii) Medical Devices & Pharmaceuticals			
(A) Tools, Machinery & Equipment	0.39	0.39	0.40
(B) General Work Surfaces	0.30	0.30	0.31
(C) Coating/Adhesive Application Equipment			
(i) Excluding Architectural Coating Equipment	3.03	3.06	3.10
(ii) Architectural Coating Equipment	8.59	8.68	8.78
(D) Ink Application Equipment			
(i) General	0.09	0.05	0.05
(ii) Flexo or Gravure	0.50	0.25	0.26
(iii) Litho/Letterpress			
(A) Roller Wash–Step 1	0.26	0.26	0.27
(B) Roller Wash-Step 2/Blanket Wash & On-Press Components	3.30	3.34	3.37
(C) Removable Press Components	0.05	0.03	0.03
(iv) Screen Printing	1.04	1.05	1.06
(v) Ultraviolet/Electron Beam Ink	0.16	0.16	0.16
(vi) Specialty Flexo	0.11	0.11	0.11
(E) Polyester Resin Application Equipment	0.10	0.05	0.05
TOTAL	**22.35**	**20.64**	**20.88**

EMISSION REDUCTIONS – CURRENT INVENTORY

Staff's proposal establishes an interim VOC limit of 500 grams per liter starting on July 1, 2005 for solvents used in the clean-up of lithographic/letterpress, screen printing, and UV/EB ink application equipment. The final VOC limit of 100 grams per liter for these cleaning applications, originally scheduled to take effect on July 1, 2005, is delayed until July 1, 2006. The expected emission reductions from these cleaning categories are calculated using the 2004 baseline VOC emissions and current, interim and final VOC limits. The emission reduction calculations are shown below:

Lithographic/Letterpress Ink Application Equipment

(a) Roller Wash–Step 1

2004 VOC Emission = 0.27 tons/day

Current VOC Limit = 600 grams/liter

2005 Interim VOC Limit = 500 grams/liter

2006 VOC Limit = 100 grams/liter

2005 Interim Emission Reduction = (0.27) x [1-(500/600)] = 0.05 tons/day

2006 Emission Reduction = (0.27-0.05) x [1-(100/500)] = 0.18 tons/day

(b) Roller Wash–Step 2, Blanket Wash & On-Press Components

2004 VOC Emission = 3.37 tons/day

Current VOC Limit = 800 grams/liter

2005 Interim VOC Limit = 500 grams/liter

2006 VOC Limit = 100 grams/liter

2005 Interim Emission Reduction = (3.37) x [1-(500/800)] = 1.26 tons/day

2006 Emission Reduction = (3.37-1.26) x [1-(100/500)] = 1.69 tons/day

Screen Printing Ink Application Equipment

2004 VOC Emission = 1.06 tons/day

Current VOC Limit = 750 grams/liter

2005 Interim VOC Limit = 500 grams/liter

2006 VOC Limit = 100 grams/liter

2005 Interim Emission Reduction = (1.06) x [1-(500/750)] = 0.35 tons/day

2006 Emission Reduction = (1.06-0.35) x [1-(100/500)] = 0.57 tons/day

UV/EB Ink Application Equipment

2004 VOC Emission = 0.16 tons/day

Current VOC Limit = 800 grams/liter

2005 Interim VOC Limit = 500 grams/liter

2006 VOC Limit = 100 grams/liter

2005 Interim Emission Reduction = (0.16) x [1-(500/800)] = 0.06 tons/day

2006 Emission Reduction = (0.16-0.06) x [1-(100/500)] = 0.08 tons/day

For the remaining solvent cleaning activities with current VOC compliance date of July 1, 2005, staff is proposing to implement the 2005 limits in accordance with the findings and recommendations in the technology assessments. These solvent cleaning activities include the cleaning of electrical apparatus/electronic components, coatings/adhesives application equipment, and ink application equipment for specialty flexographic printing. The emission reduction calculations are shown below for these cleaning activities.

Take note that the emission reductions from the clean-up of architectural coating application equipment have already been accounted for in the 2003 Rule 1171 amendment. The reductions are shown for informational purposes only, and reflect the equivalent emission reductions using the 2004 baseline emission inventory for this cleaning application.

Product Cleaning During Manufacturing or Surface Preparation

(a) Electrical Apparatus Components & Electronic Components

2004 VOC Emission = 0.51 tons/day

Current VOC Limit = 500 grams/liter

2005 VOC Limit = 100 grams/liter

2005 VOC Emission Reduction = (0.51) x [1-(100/500)] = 0.41 tons/day

Repair and Maintenance Cleaning

(a) Electrical Apparatus Components & Electronic Components

2004 VOC Emission = 0.10 tons/day

Current VOC Limit = 900 grams/liter

2005 VOC Limit = 100 grams/liter

2005 VOC Emission Reduction = (0.10) x [1-(100/900)] = 0.09 tons/day

Cleaning of Coatings or Adhesives Application Equipment (excluding Architectural Coating Equipment)

2004 VOC Emission = 3.10 tons/day

Current VOC Limit = 550 grams/liter

2005 VOC Limit = 25 grams/liter

2005 VOC Emission Reduction = (3.10) x [1-(25/550)] = 2.96 tons/day

Cleaning of Architectural Coating Application Equipment

2005 VOC Emission Reduction = 7.51 tons/day (from Staff Report, November 2003 Rule 1171 amendment; 2003 baseline inventory)

Adjusted 2005 VOC Emission Reduction (using 1.1% annual average growth)

= (7.51 tons/day) x (1.011)

= 7.59 tons/day

Specialty Flexographic Printing

2004 VOC Emission = 0.11 tons/day

Current VOC Limit = 600 grams/liter

2005 VOC Limit = 100 grams/liter

2005 VOC Emission Reduction = (0.11) x [1-(100/600)] = 0.09 tons/day

The total VOC emission reduction for year 2005 is the sum of all emission reductions from interim limits as well as emission reductions expected from the July 2005 limits that are proposed to be implemented.

Total 2005 VOC Emission Reductions = 0.05 tons/day + 1.26 tons/day + 0.35 tons/day + 0.06 tons/day + 0.41 tons/day + 0.09 tons/day + 2.96 tons/day + 0.09 tons/day
= 5.27 tons/day

Total 2005 VOC Emission Reductions:	**5.27 tons/day**

For 2006, the total VOC emission reduction for the year is as follows:

Total 2006 VOC Emission Reduction = 0.18 tons/day + 1.69 tons/day + 0.57 tons/day + 0.08 tons/day
= 2.52 tons/day

Total 2006 VOC Emission Reductions:	**2.52 tons/day**

The total VOC emission reductions of 5.27 tons per day in year 2005 are not surplus reductions but rather part of the Tier II emission reductions of 9 tons per day projected during the 1999 rule amendment that are subject to technology assessments. The August 2002 rule amendment already accelerated 1.94 tons per day of the Tier II emission reductions because of the availability at that time of compliant products for certain cleaning applications.

The 2006 VOC emission reduction of 2.52 tons/day is also part of the Tier II emission reductions, and represents the amount of emission reductions delayed as a result of moving back the compliance date by one year for screen printing, lithographic/letterpress, and UV/EB ink application equipment. This emission reduction is dependent on the results of the on-going technology assessment for these cleaning activities. For the permanent exemptions proposed for specific cleaning applications, the total foregone VOC emission reduction is estimated at 43 pounds per day (0.02 tons/day).

Table 2 summarizes the projected VOC emissions inventory for Rule 1171 and reflects the remaining inventory after applying the expected emission reductions for the affected cleaning activities.

Table 2 – Projected VOC Emissions Inventory for Rule 1171

Cleaning Activity	2004 Emissions Inventory (tons/day)	2005[1] Emissions Inventory (tons/day)	2006[1] Emissions Inventory (tons/day)
(A) Product Cleaning & Surface Preparation			
(i) General	1.37	1.37	1.37
(ii) Electrical/Electronic Apparatus & Components	0.51	0.10	0.10
(iii) Medical Devices &Pharmaceuticals	0.74	0.74	0.74
(B) Repair & Maintenance			
(i) General	0.21	0.21	0.21
(ii) Electrical/Electronic Apparatus & Components	0.10	0.01	0.01
(B) Repair & Maintenance			
(iii) Medical Devices & Pharmaceuticals			
(A) Tools, Machinery & Equipment	0.40	0.40	0.40
(B) General Work Surfaces	0.31	0.31	0.31
(C) Coating/Adhesive Application Equipment			
(i) Excluding Architectural Coating Equipment	3.10	0.14	0.14
(ii) Architectural Coating Equipment	8.78	1.19	1.19

[1] *Reflects Inventory After Reductions*

Table 2 – continued

Cleaning Activity	2004 Emissions Inventory (tons/day)	2005[1] Emissions Inventory (tons/day)	2006[1] Emissions Inventory (tons/day)
(D) Ink Application Equipment			
(i) General	0.05	0.05	0.05
(ii) Flexo or Gravure	0.26	0.26	0.26
(D) Ink Application Equipment			
(iii) Litho/Letterpress			
(A) Roller Wash–Step 1	0.27	0.22	0.04
(B) Roller Wash-Step 2/Blanket Wash & On-Press Components	3.37	2.11	0.42
(C) Removable Press Components	0.03	0.03	0.03
(iv) Screen Printing	1.06	0.71	0.14
(v) UV/EB Ink	0.16	0.10	0.02
(vi) Specialty Flexographic	0.11	0.02	0.02
(E) Polyester Resin Application Equipment	0.05	0.05	0.05
TOTAL	**20.88**	**8.02**	**5.50**

[1] *Reflects Inventory After Reductions*

COST

Staff's proposal to delay the implementation of the 100 gram per liter VOC limit for cleaning of lithographic/letterpress printing, screen printing, and UV/EB ink application equipment is a relaxation of an existing requirement in Rule 1171, and therefore does not impose additional cost to the affected industry. The staff report for the 1999 amendment of Rule 1171 provides a detailed cost-effectiveness analysis, including an incremental cost analysis, for the 100 gram per liter VOC limit for these cleaning applications.

In addition, staff analysis indicates no additional cost to the industry in complying with the proposed interim VOC limits for clean up solvents used for lithographic/letterpress printing, screen printing, and UV/EB ink application equipment. There are products currently available in the market that meet the proposed interim limit. Furthermore, industry input indicates that existing products can be readily reformulated by solvent suppliers to meet the interim limit of 500 grams per liter with very minimal cost to the industry. The average price range of cleaning materials meeting the interim VOC limit is comparable to that of existing high-VOC solvents.

In regard to the prohibition on the use of methylene chloride and perchloroethylene, staff is not aware of any facility that will be affected by this proposal. Based on input from AQMD

compliance staff and solvent suppliers, there are no known users of these toxic compounds for cleaning applications covered under Rule 1171; therefore, this proposal eliminating the use of methylene chloride and perchloroethylene in solvent cleaning operations is not expected to have any cost impact.

SOCIOECONOMIC IMPACTS

The proposed amendments to Rule 1171 mainly affect the printing industry [SIC (Standard Industrial Classification) 2711, 2752, and 2771 or NAICS (North America Industrial Classification System) 323110, 323113, and 511110]. The delay in the final compliance date would postpone the implementation cost on the printing industry. An interim VOC limit of 500 grams per liter for cleaning applications codifies the current practice, thus resulting in no additional cost. The proposed amendments would also prohibit the use of methylene chloride and perchloroethylene. Based on staff findings, currently there are no known users of these toxic compounds. As such, this requirement does not impose any cost impact. Overall, the proposed amendments would have no adverse socioeconomic impacts.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) ANALYSIS

The SCAQMD, as lead agency, has prepared a Draft Subsequent Environmental Assessment (SEA) pursuant to CEQA Guidelines §15162 for the proposed amendments to Rule 1171 because the proposed project constitutes a modification of a previously approved project that was analyzed in a Final EA that was certified by the SCAQMD Governing Board in October 1999. The proposed project will delay compliance for three solvent cleaning categories, establish a limited exemption from rule requirements for certain applications, and extend existing exemptions from the rule requirements for other cleaning applications. The analysis concluded that the delay in VOC emission reductions, along with the new and extended exemptions, will result in significant adverse air quality impacts. No significant adverse impacts were identified for any other environmental topics. The Draft SEA was circulated for a 45-day public review period on February 9, 2005. After the close of the public review period, responses to all comments will be prepared and included in the SEA, at which time the document will become a Final SEA.

COMPARATIVE ANALYSIS

The only federal requirement applicable to similar sources is the National Emission Standards for Hazardous Air Pollutants (NESHAP) requirement for handwipe cleaning in the aerospace industry. The requirements of Rule 1171, however, do not apply to handwipe cleaning in the aerospace industry; therefore, Rule 1171 is not in conflict with any federal requirement. Additionally, AQMD Rule 1401 - New Source Review of Toxic Air Contaminants and Rule 1402 - Control of Toxic Air Contaminants from Existing Sources, control the emissions of solvent containing toxic or hazardous air pollutants. Rule 1401 limits emissions from new and modified permitted sources exceeding certain thresholds, and Rule 1402 limits emissions from existing sources.

DRAFT FINDINGS UNDER THE CALIFORNIA HEALTH AND SAFETY CODE

Before adopting, amending, or repealing a rule, the California Health and Safety Code requires the AQMD to adopt written findings of necessity, authority, clarity, consistency, non-duplication, and reference, as defined in Section 40727. The draft findings are as follows:

Necessity – The AQMD Governing Board has determined that a need exists to amend Rule 1171 – Solvent Cleaning Operations, in order to delay the compliance date of VOC limits that are infeasible at this time for certain cleaning applications.

Authority – The AQMD Governing Board obtains its authority to adopt, amend, or repeal rules and regulations from the California Health and Safety Code sections 39002, 40000, 40001, 40440, 40441, 40702, 41508, and 41700.

Clarity – The AQMD Governing Board has determined that the proposed amendment to Rule 1171 is written or displayed so that its meaning can be easily understood by persons directly affected by it.

Consistency – The AQMD Governing Board has determined that Proposed Amended Rule 1171 is in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, federal or state regulations.

Non-Duplication – The AQMD Governing Board has determined that the proposed amendment to Rule 1171 does not impose the same requirements as any existing state or federal regulations, and the proposed amended rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the AQMD.

Reference – In adopting this regulation, the AQMD Governing Board references the following statutes which the AQMD hereby implements, interprets or makes specific: California Health and Safety Code sections 40001, 40440, 40702, and 41700.

PUBLIC COMMENTS AND RESPONSES

This section summarizes the verbal comments received at the January 27, 2005 Public Workshop, as well as comments received in writing.

Comment: The 100 g/l VOC limits for lithography, screen and UV clean up operations should be pushed back to one year from the completion of the technology assessment because of the lag time between identification of the lower VOC solvents and the ability of vendors to obtain and formulate like solvents. We support a new implementation date of December 1, 2006.

Response: The technology assessment for these cleaning applications is expected to be completed by November 2005. Staff believes that the proposed compliance date of July 1, 2006 allows solvent suppliers and/or manufacturers enough time to formulate low-VOC solvents identified in the study.

Comment: The proposed exemption for cleaning of metering rollers, dampening rollers, and printing plates should be tied to the completion date of the technology assessment on roller and blanket clean up washes; therefore, the exemption

sunset date should be December 1, 2006

Response: The study to find alternative cleaners for metering rollers, dampening rollers, and printing plates is part of the on-going technology assessment for lithography clean-up operations. The proposed compliance date of July 1, 2006 allows solvent suppliers enough time to formulate low-VOC cleaners identified in the study.

Comment: Language should be added to exempt aerosol cleaning products from the requirements of Rule 1171 in order to avoid potential conflict with CARB regulations. The CARB has the sole responsibility for regulating consumer products on a statewide basis. In addition, California Health & Safety Code section 41712 pre-empts inconsistent or conflicting regulation by a local district when a consumer product is subject to ARB regulations.

Response: This issue was raised during the last two amendments of Rule 1171. The AQMD believes that Rule 1171 is not in conflict with CARB's consumer products regulation nor is preempted by the California Health and Safety Code section 41712. Rule 1171 does not set VOC limits on any consumer product, e.g., aerosol cleaning products, but rather may in essence set restrictions on the use of consumer products for industrial solvent cleaning. In addition, CARB's Office of Legal Affairs indicated in its letter to the AQMD dated July 31, 2002 that the Health and Safety Code regulation "does not impose any regulatory restrictions on the use of VOC-containing products that occur at stationary sources (such as automotive service and parts centers), which have been traditionally regulated by the districts. Such regulation on the use of consumer products at stationary sources falls squarely within the long-established authority of the districts to regulate pollution-generating activities at stationary sources, including area sources, and is not preempted by Health and Safety Code section 41712(f)."

Comment: We have tested many potential alternative cleaners for repair (wipe) cleaning of electronic components but we have not been successful in finding a substitute cleaner for IPA. Alternative cleaners identified in the Technology Assessment report have been tested, but did not remove rosin flux at acceptable cleanliness levels or the cleaner was incompatible with the material (caused delamination or measling). We recommend that an exemption be provided for repair cleaning of high-reliability electronic printed circuit boards.

Response: Staff agrees that alternative cleaners may not work for certain type of printed circuit board cleaning. Additional information obtained from a company that participated in the Technology Assessment indicates that there are compatibility problems with the use of alternative cleaners identified in the study on certain substrates. A limited exemption is being added to the rule to exempt touch up cleaning performed on printed circuit boards where surface mount devices have already been attached provided that the solvent used contains no more than 800

grams of VOC per liter. The emissions associated with this specific cleaning application are small.

Comment: The cleaning of old antique brass furniture needs to use high-VOC solvents. The use of no-VOC or low-VOC solvents (25 g/l or less VOC content) leaves residues on the surface of the parts that are cleaned. Rule 1171 should provide an exemption based on usage in order to protect this type of furniture refurbishment from being phased out.

Response: The cleaning application mentioned by the commenter belongs to the "General" category under "Repair and Maintenance Cleaning" and is not part of this rule amendment. The current VOC limit for this application is 25 g/l, which took effect on January 1, 2003. Since then, staff is not aware of any other company having difficulty meeting this requirement particularly for cleaning of metal parts. Staff believes that enough products are available to meet the commenter's cleanliness requirements. Currently, there are more than 100 Clean Air Solvents and several VOC-exempt compounds that meet the VOC requirements of Rule 1171. The commenter needs to continue testing of compliant products in order to find an acceptable substitute cleaner.

Comment: The District relies on outdated ARB data and methodology that includes solvents used for thinning and clean up to estimate VOC emissions from solvent clean-up of architectural coating application equipment. Emissions from clean-up activities are now negligible because of less thinning of coatings and improved clean-up practices. Rule 1171 should focus on ensuring that applicators follow current industry clean-up practices rather than promoting solvent substitutions. In addition, the use of acetone as a substitute cleaner would result to about 15 times more ozone formation than mineral spirits because of acetone's high evaporation rate and low reactivity.

Response: These issues were raised during the 2003 amendment of Rule 1171, and are unrelated to the current proposed amendments. The methodology used in estimating VOC emissions inventory is outlined in the staff report for the 2003 Rule 1171 amendment, and reflects the best available data obtained from recent surveys conducted by CARB and AQMD regarding thinning and housekeeping practices. While good housekeeping practices are useful in minimizing usage of clean up solvents and associated emissions, they do not ensure that VOC emissions are reduced to the maximum extent feasible. A regulatory VOC limit is necessary to ensure that migration toward ultra-low or zero-VOC alternative cleaning solvents happens and VOC emissions are reduced to the maximum extent possible.

Staff agrees that acetone's relatively high evaporation rate compared to mineral spirits would cause an increase in solvent (acetone) usage. In a report for the AQMD, the Institute for Research and Technical Assistance (IRTA) has estimated based on actual case studies that solvent cleaning with acetone would

require about 10 percent more solvent than the existing solvents that would be replaced, e.g., mineral spirits. Therefore, acetone's lower reactivity is not offset by much greater emissions, as argued by the commenter. Existing good housekeeping practices, as required by Rule 1171, are expected to continue to minimize solvent evaporation. Furthermore, acetone by definition is not considered a VOC; therefore, its high evaporation rate will not cause the formation of more ozone in the atmosphere. In addition, despite mineral spirits' lower evaporation rate, it eventually will evaporate and cause ozone.

On the issue of reactivity as a VOC control strategy, the AQMD continues to believe that controlling VOCs based on reactivity is not a viable regulatory approach at this time because of the limited amount of information available regarding reactivity of many VOC materials, including those used in solvent cleaning. According to Dr. William Carter, studies are being conducted to refine VOC reactivity data on many VOC materials, including mineral spirits. Furthermore, the AQMD has an on-going contract with CE-CERT to further evaluate the reactivity and availability of some VOC species found in architectural coatings. Additionally, CARB has a similar project with CE-CERT to further evaluate reactivity of texanol and several petroleum distillates. The CARB study is complete and staff is currently evaluating the data and final report. However, a preliminary conclusion indicates that mineral spirits have slightly differing reactivity values depending on aromatic content, but are still considered to be highly reactive when compared to acetone. The AQMD will continue to use a mass VOC control strategy and continue to work with CARB on evaluating pilot programs for incorporating reactivity-based options.

Comment: The cleaning of power generation and distribution equipment requires the use of high-flashpoint hydrocarbon solvents with VOC content ranging from 750 g/l to 900 g/l. HCFC-141b-based solvents (VOC-exempt) are acceptable substitutes, but production of the chemical has been banned since 2003. Alternative cleaners tested that meet the 100 g/l VOC limit were either extremely flammable or did not perform well in removing contaminants. We request that the current 900 g/l VOC limit be kept for cleaning electrical apparatus components.

Response: One of the critical cleaning applications included in the technology assessment involved finding low-VOC alternative cleaners for electrical apparatus components. The technology assessment discussed the successful testing at two facilities of water-based and soy-based formulations for cleaning non-energized electrical equipment. One of the facilities that participated in the study currently cleans non-energized field equipment with water-based cleaner containing less than 10 percent glycol ether. The results of the study prove that the 100 g/l VOC limit can be achieved for cleaning non-energized electrical equipment.

For cleaning of energized field electrical equipment, the technology assessment indicated that HCFC-141b-based solvents (VOC-exempt) are currently being used as alternative cleaners. Staff agrees that the availability of this compliant product may become scarce in the near future because of the existing production

ban on the chemical. However, the rule currently provides facilities the flexibility of using aerosol products containing VOCs provided the usage is limited to 160 fluid ounces per day per facility. This rule provision applies to locations where field cleaning occurs. In addition, facilities can continue to test other low or non-VOC compounds in order find to acceptable substitute cleaners.

Comment: There needs to be a rule exemption to allow use of higher VOC solvents for non-destructive evaluation (NDE) and non-destructive testing (NDT) of various mechanical/electrical parts or systems in order to find defects, flaws, damage, and cracks. Solvents used in NDE/NDT are often required to be certified as part of an evaluation/testing system per industry standards.

Response: This issue has never been brought up in previous Rule 1171 amendments. Staff agrees that procedures for use in NDE/NDT need to be certified. However, the cleaning of parts prior to testing is not limited to the use of VOC solvents. Based on conversation with a contractor performing NDE/NDT, other cleaning methods may be utilized as long as that particular cleaning method is part of a certified testing procedure. Approval or certification of equivalent NDE/NDT testing procedure takes about 2 weeks.

Comment: Rule 1171 should provide continuing incentive to printers with solvent recycling stills since there is a substantial and quantifiable environmental benefit to the continued use of on-site solvent recovery stills. The VOC content as adopted should not be below a level that reduces the economic incentive for these stills.

Response: Staff agrees on the environmental benefit of using solvent recovery stills. However, staff believes that more VOC emission reductions can be achieved by lowering the VOC content of cleaning materials. Though some solvents may be more difficult to recycle than others, Rule 1171 does not mandate the use of any particular solvent. Facilities can continue to use “recyclable” cleaning materials so long as they are compliant with the rule requirement.

Comment: There needs to be an exemption for cleaning of adhesive coating surfaces. A strong solvent is required for removal of adhesives. This exemption could be based on the total amount of solvent used.

Response: Staff is unsure if the comment concerns removal of cured or uncured adhesives. Rule 1171 section (h)(2)(G) currently provides an exemption for the removal (stripping) of cured adhesives. For removing uncured adhesives, the technology assessment indicates that acetone and soy/water blends are effective substitutes for high-VOC cleaners; therefore, this application does not warrant additional exemption.

Comment: We are participants to the on-going study to develop alternative solvents for

cleaning ink printing application equipment. We have tested many different formulations but have not yet achieved success in finding acceptable solvent replacements. We support the proposed interim VOC limit as this will give us additional time to solve complex cleaning issues.

Response: Staff appreciates the cooperation of companies participating in the technology assessment. Staff's proposal to delay implementation of VOC limits for specific cleaning applications is intended to provide more time for testing potential alternative cleaners that were identified during the early stage of the technology assessment, and resolve any cleaning issues related to the use of these cleaners. The study is expected to be completed in November 2005. The final limits for these cleaning applications will be determined after staff has completed evaluating the results of the technology assessment.

Comment: We have not been able to identify a viable aqueous or exempt solvent cleaning substitute that will meet the same standards as IPA for (wipe) cleaning solar cells, laser hardware, scientific instruments, and high-precision optics. Emissions are negligible and maintaining the current exemption will have no significant impact to the environment.

Response: Staff is aware of facilities that currently use exempt solvents, i.e., acetone for the above cleaning applications. Furthermore, the technology assessment identified low or no-VOC cleaners for these applications. However, additional data obtained by staff indicate that certain optics coatings are not compatible with the alternative cleaners identified, and will require the continued use of IPA for cleaning until an acceptable replacement solvent is found. Staff, therefore, will retain the exemption for these applications. The emissions associated with these cleaning applications are negligible.

Comment: Staff continues to leave the test method for determining composite partial pressure of materials in Rule 1171 but does not provide anywhere for its use.

Response: Staff will remove rule language pertaining to VOC composite partial pressure of materials.

Comment: The AQMD vapor pressure study did not evaluate the relationship between vapor pressure and emission rates, as agreed during the 1999 amendment to Rule 1171.

Response: The rule language pertaining to the vapor pressure study states "The technology assessment shall include a study of the effect of vapor pressure on the total mass emissions of VOCs from the use of cleaning solvents." As previously communicated to the commenter, the study addressed the requirement in the rule by evaluating the relationship between vapor pressure and mass emissions rather than vapor pressure and emission rate. The study concluded that vapor pressure does not affect total mass emissions of VOCs from the use of cleaning solvents.

Comment: There is no mention in the preliminary staff report about the completion of the study on the relationship of vapor pressure and emission rates because the study did not undertake that task.

Response: The vapor pressure study focused on evaluating the effect of vapor pressure on the total mass emissions (and not emission rates) of VOCs from the use of cleaning solvents. A brief discussion of the results of the vapor pressure study will be added in the staff report.

Comment: The staff report implies that low-VOC materials for lithography have been demonstrated, and that only the compatibility issue requires further review. Staff needs to clarify that alternative solvents have been tested for wipe applications only and over a short period of time. These formulations still need to be tested over a longer timeframe and in different operations.

Response: Staff agrees. Language is added in the staff report to clarify that extended testing of potential alternative solvents applies not only to wipe cleaning operations but also to other different operations, e.g., automatic blanket wash.

Comment: Cost estimates should have been presented in the preliminary draft staff report for those activities that have VOC reductions.

Response: While it is true that the preliminary draft staff report did not contain cost data at the time the report was released to the public, the cost of the proposed amendments was presented and discussed during the public workshop. A cost analysis of the proposed amendments is included in the staff report. The cost analysis concluded there would be no additional cost associated with the proposed amendments.

Comment: The introductory sentence in the Technology Assessment section of the rule needs to be revised to reflect the new completion date of the study for lithography, screen and UV clean up operations.

Response: Staff agrees. Rule language has been updated to reflect the new completion date of December 1, 2005 for cleaning applications with on-going technology assessment.

Comment: The commenter has suggested revised language pertaining to the test method for determining the efficiency of an emission control device.

Response: Staff's proposal reflects the most recent test method for determining the efficiency of emission control devices, and is consistent with existing language found in other VOC rules.

Comment: Further clarification is needed to express the District's intent of including electron beam operations in future field testing as part of the technology

assessment. Additionally, we request that field testing not be limited to press components such as blankets or rollers but to include cleaning of lamps and auxiliary UV/EB equipment such as reflectors.

Response: Clarifying language has been added in the rule to include EB inks in the technology assessment. However, field testing will not include alternative cleaners for UV/EB lamps and auxiliary equipment such as reflectors because staff does not believe that cleaning of this equipment is problematic. Staff's proposal to extend by one year the exemption for the cleaning of UV/EB lamps, including reflectors, provides the industry additional time to develop and test alternative solvent cleaners.

Comment: We are unable to accept an interim limit of 500 g/l VOC for cleaning UV/EB inks when our entire industry is given only one compliant product. Low-VOC cleaners may have worked well for manual equipment but we have no data showing that they would work for automatic equipment. We urge you to retain the current 800 g/l limit until further study is completed.

Response: The information staff received from industry members indicates that products are readily available from several manufacturers that will meet the 500 g/l interim VOC limit. Facilities need to test these products in order to identify a cleaner that best meets their cleaning requirements. Staff is confident that more products will be formulated that comply with the interim VOC limit.

Comment: The rule is ambiguous as to whether ink jet printing is included under section 1171(c)(1)(D).

Response: The cleaning of inkjet printers falls under Rule 1171(c)(1)(D)(i), "General Cleaning of Ink Application Equipment". In fact, section (h)(7) clearly specifies the applicability of section (c)(1)(D)(i) to the cleaning of ink application equipment used in inkjet printing. The VOC limit for solvents used in this cleaning application is 25 g/l beginning July 1, 2005.

Comment: The term "Cleaning of Ink Application Equipment" is so broad as to potentially include the ink delivery system under the requirements of Rule 1171. In some inkjet printing operations, solvent is recycled automatically through the machine and is used to maintain the viscosity of the ink. AQMD needs to clarify what constitutes cleaning operations for ink jet printers.

Response: For inkjet printing, the cleaning process typically involves the removal of uncured ink from inkjet print heads using solvents. Removal of cured ink is currently exempt from the requirements of Rule 1171. Uncured inks are removed from the print heads by wipe cleaning with solvent, performing "ink purging" where solvent is fed into the print heads, or by rinsing the print heads with solvent (in squirt bottles) and some brushing to aid in the cleaning process. Recycling of solvent through the machine to maintain ink viscosity is not

considered part of the cleaning process.

Comment: We request that the AQMD undertake a technical assessment of the ink jet printing industry and delay the July 1, 2005 compliance date for the 25 g/l VOC limit. Manufacturers have been unsuccessful in developing 25 g/l solvents for use in ink jet cleaning.

Response: Staff disagrees. Staff is aware of facilities that currently comply with the requirements of Rule 1171 for cleaning inkjet printing equipment. Acetone, a VOC-exempt compound, has successfully replaced the VOC solvents previously used to remove uncured ink from print heads. One facility has also implemented changes in its cleaning procedure for long-term equipment shutdown. Additionally, Rule 1171 allows the option of using an emission control device for facilities choosing to use VOC solvents for cleaning.

Comment: We have tested different low-VOC solvents for cleaning adhesive coaters but have not found an acceptable substitute cleaner for IPA. We request a limited exemption to allow certain amount of IPA to be used.

Response: Additional information provided by the commenter indicates that this company uses water to remove uncured water-based adhesives from the adhesive application equipment (rollers). Subsequent cleaning using IPA is performed to remove any cured adhesives remaining on the rollers. Removal of cured adhesives is exempt from Rule 1171 requirements.

Comment: Water or low-VOC cleaning solutions are ineffective at cleaning application equipment used for solvent-borne fluoropolymer coatings and an exemption is needed for such cleaning application.

Response: Staff agrees and a limited exemption will be provided for the cleaning of solvent-borne fluoropolymer coatings.

Comment: It is not clear if the daily usage limit for the aerosol exemption includes the use of compliant aerosol products.

Response: Staff agrees. The 160 fl oz limit for the aerosol exemption applies to the use of non-compliant aerosol products only. The exemption language is being modified to clarify rule intent.

Comment: Staff needs to clarify if solvent cleaning operations in food product manufacturing falls under Rule 1171.

Response: Solvent cleaning, excluding sterilization, of equipment used in food manufacturing and processing is subject to the requirements of Rule 1171(c)(1)(B)(i)–General Repair and Maintenance Cleaning. The current solvent VOC limit for this cleaning category is 25 g/l. Sterilization, however, of

equipment used in the food manufacturing process must comply with the provisions of Rule 1131 - Product Manufacturing and Processing Operations.